REMARKS

Claims 1-12 are currently pending. Reexamination and reconsideration of the pending claims are respectfully requested.

Response to Arguments

In the Response to Arguments section of the present Office Action, the Examiner comments on the Applicants' arguments submitted in the Amendment mailed October 9, 2003 that there is no suggestion to combine Sikes, Roustaei, Pierce, and Siler. The Examiner asserts that "Sikes teaches a method for finding color register marks printed on a paper substrate using an image processor." The Examiner also asserts that "Roustaei teaches an image processor using FPGA used in a scanning or imaging device (imaging device = printing device = printing press) to increase processing speed and image processing quality." The Examiner also indicates that the image processor using FPGA to increase processing speed and image processing quality has been well known in the art, so the incorporation of a FPGA processor with the apparatus taught by Sikes might be complex, but it is doable to one having ordinary skill in the art. The Examiner further asserts that it would have been obvious to modify Sikes to process an image to find color register marks printed on a paper substrate using an image processor using FPGA since Roustaei teaches that such an arrangement is beneficial.

First, Applicants would like to point out that the Examiner is incorrect in the assertion that an imaging device is the same as a printing press. An imaging device can be used to identify certain markings in various applications, but an imaging device is not a printing device. Likewise, a printing device is not an imaging device. An imaging device and a printing device are not interchangeable terms as the terms have very different meanings in the art. An imaging device and a printing device perform very different functions.

An embodiment of the present invention utilizes an imaging device, i.e., a camera assembly, to detect registration marks that have been printed on a substrate by a printing press. The imaging device and the printing device are separate entities of the present invention, therefore, the imaging device and the printing device cannot be the same thing as asserted by the Examiner.

Next, to establish a *prima facie* case of obviousness under Section 103, three basic criteria must be met. *M.P.E.P.* § 2143. First, there must be some suggestion or motivation, either in the references themselves or in the knowledge generally available to one of ordinary skill in the art, to modify the references or to combine the reference teachings. Second, there

must be a reasonable expectation of success. Finally, the prior art reference (or references when combined) must teach or suggest all the claim limitations. The teaching or suggestion to make the claimed combination and the reasonable expectation of success must both be found in the prior art, not in Applicant's disclosure. *See M.P.E.P.* § 2143.1. Moreover, it is improper to combine references where the references teach away from their combination. *See M.P.E.P.* § 2145. The Examiner's proposed combination of references does **not** meet the above criteria with respect to the subject matter of the claims. The Examiner's assertion that incorporating the FPGA of Roustaei with the apparatus disclosed in Sikes is doable is not the legal standard. Furthermore, the Examiner's assertion that it would be obvious to modify the apparatus of Sikes to include the FPGA of Roustaei is beneficial for increasing processing speed and image processing quality is not sufficient motivation to combine the teachings of the references. In research and development, goals for technological advancement is to develop methods and devices that operate faster and more efficiently. Just because an FPGA can operate in the context of a bar code scanning application as disclosed in Roustaei, does not mean that an FPGA can operate in a printing press. Therefore, Applicants respectfully request that the Examiner provide sufficient reasons for the motivation to combine the Sikes and Roustaei references.

Claim Rejections – 35 U.S.C. § 103

Claims 1-3 are rejected under 35 U.S.C. § 103 as being unpatentable over U.S. Patent No. 5,018,213 ("Sikes") in view of U.S. Patent No. 6,123,261 ("Roustaei").

Independent Claim 1 calls for, among other things, the act of processing the image to determine whether the color register mars are found therein, said processing including using an FPGA. As acknowledges by the Examiner, Sikes does not teach or suggest the use of an FPGA.

Roustaei does not cure the deficiencies of Sikes. Roustaei does not teach or suggest a method for decreasing the time spent searching for color register marks printed on a paper substrate on a printing press including the act of processing the image to determine whether the color register marks are found therein, said processing including using an FPGA. Rather, Roustaei discloses an optical scanner 15 for reading optically encoded information and symbols, and more specifically, a hand-held bar code scanner. The optical scanner 15 utilizes an FPGA to process the image of a target 510 that has been scanned. The optical scanner 15 includes an illumination apparatus 72, which illuminates the image 210. The optical scanner 15 also includes a sensor 20 that reads the target 510 (which includes the image 210) and

outputs gray scale data to the FPGA 10. The optical scanner 15 looks for a series of coherent bars and spaces and decodes the bars and spaces.

Roustaei does not disclose the analysis and processing of color register marks. In addition, Roustaei does not disclose using an FPGA to process color register marks that are printed on a moving web (at a speed of 2,000-3,000 ft/min). Rather, Roustaei discloses processing black and white symbologies (e.g., bar codes).

Sikes discloses a color to color registration system 110 for a commercial web printing apparatus. A commercial web printing apparatus runs at an approximate speed of 2,000-3,000 feet per minute. The system includes an image acquisition camera 16 to acquire an image from a moving web 114, an illuminator 112 to illuminate the web 114 at a predetermined time, and an control circuitry 220. The web 114 includes color registration marks 10 comprising a plurality of dot pairs 20, 22, 24, and 26 where each dot pair is either black, yellow, cyan, or magenta. Each dot is twelve thousands of an inch in diameter and each dot is spaced 24 thousands of an inch apart horizontally. The detection of each color registration mark is crucial to the proper printing of an image on the web 114. If one of the color print units is out of registration, the detection of the amount of misregistration (e.g., the amount a dot pair is shifted relative to another dot pair) as determined by the color registration mark 10 can be communicated to the specific color print unit for correction.

Additionally, there is no suggestion or motivation to combine the asserted reference teachings. The systems disclosed in Sikes and Roustaei are very different, and just because an FPGA can be used in an optical scanner does not make it obvious to use an FPGA in a camera assembly for detecting color registration marks on a moving web of a printing press. In addition, Sikes and Roustaei do not provide the necessary suggestion and motivation to be combined. Furthermore, a person of ordinary skill in the art would not look to optical scanners that detect black and white images to solve a problem with the detection of color registration marks in the printing industry. Moreover, an FPGA can utilize many different algorithms, and an algorithm used for processing black and white is basically useless for an application that requires sensitive color processing with the detection of color, location of each registration dot, and difference from correct location.

First, a color to color registration system as in Sikes requires a special lighting source that is not a typical LED as used in the Roustaei system. The special lighting is required because the acquisition camera 16 needs to be able to detect a high and a low contrast between the various colors in the registration mark 10. A light source, such as an LED in the

Roustaei system is adequate for detecting high contrast between black and white, but an LED is insufficient for detecting high and low contrast between black, yellow, cyan, and magenta.

Second, in the printing industry, a registration mark must be very small (virtually undetectable by the naked eye, e.g., each dot is twelve thousands of an inch in diameter and each dot is spaced 24 thousands of an inch apart horizontally), as disclosed in Sikes, such that the registration mark does not affect the printed piece (e.g., newspaper, magazine, etc.) and the reader's ability to read the printed piece. In addition, the registration mark must be unique such that it can be detected throughout the printed piece to insure that the printed images are properly aligned on each page. In contrast, in Roustaei, the size of a bar code is much larger and does not need to blend in or be detected amongst a background of the same colors.

Third, in Sikes, the detection of the registration mark and whether misregistration is detected, provides feedback that affects an upstream process in order to properly maintain aligned images on each page of the web. The system in Roustaei requires no such feedback and does not affect any other system or functionality of the optical scanner, but rather Roustaei is concerned with being able to develop hardware that can detect the bar code at a variable depth of field.

Finally, the system in Sikes must be capable of detecting a regular pattern (e.g., the registration mark). The system not only needs to detect the regular pattern, but it also must be able to correctly detect what is a regular pattern and correctly reject what is not a regular pattern within a very short period of time. In contrast, the system in Roustaei must detect the bar code to decode the information in the bar code, which provides instructions on where to direct the item containing the bar code (Roustaei discloses a package sortation device).

In addition, Applicants incorporate the arguments and discussion in the Response to Arguments section pointing out the Examiner's errors in examination as additional reason why the subject matter of independent Claim 1 is not obvious in view of the prior art.

For at least the reasons noted above, Sikes combined with Roustaei does not teach or suggest the subject matter of Claim 1. Accordingly, independent Claim 1 is allowable. Claims 2-5 depend from Claim 1, and are therefore allowable for at least the reasons set forth above with respect to Claim 1.

Claim 4 is rejected under 35 U.S.C. § 103 as being unpatentable over Sikes in view of Roustaei, and further in view of U.S. Patent Application Publication No. 2002/0084648 ("Pierce").

Claim 4 depends from independent Claim 1, and is therefore allowable for at least the reasons discussed above with respect to Claim 1. In addition, Pierce does not cure the deficiencies of Sikes and Roustaei. Accordingly, Claim 4 includes additional patentable subject matter.

Claim 5 is rejected under 35 U.S.C. § 103 as being unpatentable over Sikes in view of Roustaei, and further in view of U.S. Patent Application Publication No. 2003/0010235 ("Siler").

Claim 5 depends from independent Claim 1, and is therefore allowable for at least the reasons discussed above with respect to Claim 1. In addition, Siler does not cure the deficiencies of Sikes and Roustaei. Accordingly, Claim 5 includes additional patentable subject matter.

Claims 6 and 8-12 are rejected under 35 U.S.C. § 103 as being unpatentable over Sikes in view of Roustaei, and further in view of Pierce.

As discussed above, with respect to independent Claim 1, Sikes and Roustaei do not provide the necessary motivation and suggestion to be combined. In addition, Pierce does not cure the deficiencies of Sikes and Roustaei. Accordingly, independent Claim 6 is allowable. Claims 7-12 depend from Claim 6, and are therefore allowable for at least the reasons set forth above with respect to Claim 6.

Claim 7 is rejected under 35 U.S.C. § 103 as being unpatentable over Sikes in view of Roustaei and Pierce, and further in view of Siler.

Claim 7 depends from independent Claim 6, and is therefore allowable for at least the reasons discussed above with respect to Claim 6. In addition, Siler does not cure the deficiencies of Sikes, Roustaei, and Pierce. Accordingly, Claim 7 includes additional patentable subject matter.

CONCLUSION

In view of the above remarks, it is submitted that the application is in condition for allowance.

Respectfully submitted,

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